

2

OIPE

RAW SEQUENCE LISTING DATE: 07/22/2002 PATENT APPLICATION: US/10/021,425 TIME: 09:35:07

Input Set : A:\Pto.amc

2 <110> APPLICANT: Suzanne L. Bolten

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3
             Alan M. Easton
     4
             Leslie C. Engel
                                                             ENTERED
     5
             Dean M. Messing
     6
             John S. Ng
     7
             Beverly A. Reitz
     8
             Scott A. Vaccaro
     9
             Mark C. Walker
    10
             Ping T. Wang
    11
             Robin A. Weinberg
    13 <120> TITLE OF INVENTION: Aspergillus ochraceus 11 alpha
    14
             hydroxylase and oxidoreductase
    17 <130> FILE REFERENCE: S03196-00-US
C--> 19 <140> CURRENT APPLICATION NUMBER: US/10/021,425
C--> 20 <141> CURRENT FILING DATE: 2001-10-30
    22 <150> PRIOR APPLICATION NUMBER: USSN 60/244,300
    23 <151> PRIOR FILING DATE: 2000-10-30
    25 <160> NUMBER OF SEQ ID NOS: 65
    27 <170> SOFTWARE: FastSEQ for Windows Version 4.0
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    31 <212> TYPE: DNA
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    35 <221> NAME/KEY: CDS
    36 <222> LOCATION: (146)...(1690)
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                                                                              120
    42 agccacaagc tgacagctca ttatc atg ccc ttc ttc act ggg ctt ctg gcg
                                                                              172
    43
                                    Met Pro Phe Phe Thr Gly Leu Leu Ala
    44
    46 att tac cat agt ctc ata ctc gac aac cca gtc caa acc ctg agc acc
                                                                              220
    47 Ile Tyr His Ser Leu Ile Leu Asp Asn Pro Val Gln Thr Leu Ser Thr
                             15
    50 att gtc gta ttg gcg gca gcg tac tgg ctc gca acg ctc cag ccg agc
                                                                              268
    51 Ile Val Val Leu Ala Ala Ala Tyr Trp Leu Ala Thr Leu Gln Pro Ser
    52
                         30
                                             35
                                                                  40
    54 gac ctt cct gag ctg aat ccc gcc aaa cca ttc gag ttc acc aat cgt
                                                                              316
    55 Asp Leu Pro Glu Leu Asn Pro Ala Lys Pro Phe Glu Phe Thr Asn Arg
                     45
                                         50
    58 cgt cgt gtt cat gag ttt gtt gaa aat agt aag agc ttg ctt gct cgg
                                                                              364
```

Input Set : A:\Pto.amc

62 ggg agg gaa ttg cac ggg cac gag ccg tac aga ctc atg tct gaa tgg 63 Gly Arg Glu Leu His Gly His Glu Pro Tyr Arg Leu Met Ser Glu Trp 64	59 60	Arg	Arg	Val 60	His	Glu	Phe	Val	Glu 65	Asn	Ser	Lys	ser	Leu 70	Leu	Ala	Arg	
66 gga tcc ttg att gtc ctg ccc cca gag tgc gac gag ctg cgc ac dad 60 67 Gly Ser Leu Ile Val Leu Pro Pro Glu Cys Ala Asp Glu Leu Arg Asn 68 90 95 100 105 105 105 105 105 105 105 105 10	62	ggg	agg	gaa	ttg	cac	ggg	cac	gag	ccg	tac	aga	ctc	atg	tct	gaa	tgg	412
66 gga tcc ttg att gtc ctg ccc cca gag tgc gcc gac gag ctg cgc aac 460 67 Gly Ser Leu Ile Val Leu Pro Pro Glu Cys Ala Asp Glu Leu Arg Asn 68 90	63	Gly	Arg	Glu	Leu	His	Gly	His	Glu	Pro	Tyr	Arg	Leu	Met	Ser	Glu	Trp	
67 Gly Ser Leu Ile Val Leu Pro Pro Glu Cys Ala Asp Glu Leu Arg Ash 68 90 95 100 105 70 gac cca aga atg gac ttt gag acg ccc acc acc gac gac tcc cac gga 71 Asp Pro Arg Met Asp Phe Glu Thr Pro Thr Thr Asp Asp Ser His Gly 72 110 115 120 73 tat atc cct ggc ttc gac gct ctc aac gac gac ccg aac ctg act aaa 556 75 Tyr Ile Pro Gly Phe Asp Ala Leu Asn Ala Asp Pro Asn Leu Thr Lys 76 125 130 135 78 gtg gtc acc aag tac ctc aca aaa gca ttg acc aag ctt act gcc ccg 79 Val Val Thr Lys Tyr Leu Thr Lys Ala Leu Asn Lys Leu Thr Ala Pro 80 140 145 150 160 82 atc tcg cat gaa gcg tcc atc gcc atg aaa gcg gtc gg gt gac gat 83 Ile Ser His Glu Ala Ser Ile Ala Met Lys Ala Val Leu Gly Asp Asp 84 155 160 165 86 cca gat tgg cgt gag atc tac cca gcc aga gac ttg ctc cag ctc gtc 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 88 170 175 180 185 90 gcc cgg atg tcg aca aga gtg tcc ct ggc gag gaa atg tac cca gcc gag aga atg tac gac aga gtg tcc gtg gat gac gat 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200 94 cag gat tgg acc aac cta acc caa acc gag aga atg tac gac gac gac gac gat gt gac aga ctt aga acc gag aga atg acc gac gac gac gac gac gac gat gt gac gac acc gac acc gac aga acc gac gac	64		75					80					85					
100 105 108 108 109																		460
70 gac cca aga atg gac ttt gag acg ccc acc acc gac gac tcc cac gga 71 Asp Pro Arg Met Asp Phe Glu Thr Pro Thr Thr Asp Asp Ser His Gly 72	67	Gly	Ser	Leu	Ile	Val	Leu	Pro	Pro	Glu	Cys	Ala	Asp	Glu	Leu	Arg	Asn	
71 Asp Pro Arg Met Asp Phe Glu Thr Pro Thr Thr Asp Asp Ser His Gly	68	90					95					100					105	
72		_		_	_	_			_				_	-				508
74 tat atc cct ggc ttc gac gct ctc aac gca gac ccg aac ctg act aaa		-	Pro	Arg	Met	Asp	Phe	Glu	Thr	Pro	Thr	Thr	Asp	Asp	Ser		Gly	
75 Tyr Ile Pro Gly Phe Asp Ala Leu Asn Ala Asp Pro Asn Leu Thr Lys 76	72					110					115					120		
76 125 130 135 78 gtg gtc acc aag tac ctc aca aag agca ttg aac aag ctt act gct ccg 604 79 Val Val Thr Lys Tyr Leu Thr Lys Ala Leu Asn Lys Leu Thr Ala Pro 60 80 140 145 150 82 atc tcg cat gaa gcg tcc atc gcc atg aaa gcg tyc ctg ggt gac gat 652 83 11e Ser His Glu Ala Ser Ile Ala Met Lys Ala Val Leu Gly Asp Asp 652 84 155 160 165 86 cca gat tgg gdg gad atc tac cca gcc aga gac ttg ctc cag ctc gtc 700 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 185 81 170 175 180 185 90 gcc cgg atg tcg aca agg gtg ttc ctt tggc gag gaa at tg tgc aat aac 748 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 20 92 190 195 200 94 cag gat tgg ac caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 796 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 796 96 101 Asp Trp Ile Gln Thr Ser Ser Gln Tyr Pro Arg Met Ile Arg Pro Ile Val 100 205 210																		556
78 gtg gtc acc aag tac ctc aca aaa gca ttg aac aag ctt act gct ccg 79 Val Val Thr Lys Tyr Leu Thr Lys Ala Leu Asn Lys Leu Thr Ala Pro 80 140 145 150 150 82 atc tcg cat gaa gcg tcc atc gcc atg aaa gcg gtg ctg ggt gac gat 83 Ile Ser His Glu Ala Ser Ile Ala Met Lys Ala Val Leu Gly Asp Asp 84 155 160 165 166 86 cca gat tgg cgt gag atc tac cca gcc aga gac ttg ctc cag ctc gtc 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 88 170 175 180 185 90 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat aac 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200 94 cag gat tgg aca acc tca tca caa tac gcg gcc ctt gcc ttc ggt 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96 205 210 215 98 gtc ggt gac aag ctt aga at at ac ccg aga atg acc gat cg acg atg 100 220 225 230 102 cat tgg ttc atg cca tcc tgt tgg gag ctg cgc cga tcg ctg cgc 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ctg aag 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag gag ctg ggt ccc tat gtt gag gat ccc ctt atg ttt gat gat tcc atc 111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac acc aga gg gcc ctc ctc 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 110 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 110 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 110 Glo Cat gg ccat gag cat gas ctc ccc aaa ccc acc acc acc aga gtg ctc ctc 110 Glo Cat gg ccat acc ccc acc acc acc acc acca acca	75	Tyr	Ile	Pro	Gly	Phe	Asp	Ala	Leu	Asn	Ala	Asp	Pro	Asn		Thr	Lys	
79 Val Val Thr Lys Tyr Leu Thr Lys Ala Leu Asn Lys Leu Thr Ala Pro 80																		
80			-															604
62 atc tcg cat gaa gcg tcc atc gcc atg aaa gcg gtg ctg ggt gac gat 83 Ile Ser His Glu Ala Ser Ile Ala Met Lys Ala Val Leu Gly Asp Asp 84 155 160 160 165 86 cca gat tgg cgt gag atc tac cca gcc aga gac ttg ctc cag ctc gtc 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 88 170 175 180 185 90 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat aac 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200 94 cag gat tgg atc caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96 205 210 215 98 gtc ggt gac aag ctt aga ata tac ccg aga atg atc aga ccg ata gta 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100 220 225 230 102 cat tgg ttc atg cca tcc tgt tgg gag ctg cgc cga tcg ctg cga cgc 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104 235 240 245 106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ttg aag 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag gag acc ctt atg ttt gat gat tcc atc 110 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 114 gag tgg ttc gag cga gag ctg gcc cac acc acc gac gcc gtc ctg 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct acc acc acc acc acc acc acc acc acc a	79	Val	Val		Lys	Tyr	Leu	Thr	_	Ala	Leu	Asn	Lys		Thr	Ala	Pro	
83 Ile Ser His Glu Ala Ser Ile Ala Met Lys Ala Val Leu Gly Asp Asp 84 155 160 165 165 165 165 166 cca gat tgg cgt gag atc tac cca gcc aga gac ttg ctc cag ctc gtc 700 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Gln Leu Val 88 170 175 180 185 180 185 185 190 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat acc 748 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200																		
84																		652
86 cca gat tgg cgt gag atc tac cca gcc aga gac ttg ctc cag ctc gtc 87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 88 170				His	Glu	Ala	Ser		Ala	Met	Lys	Ala		Leu	Gly	Asp	Asp	
87 Pro Asp Trp Arg Glu Ile Tyr Pro Ala Arg Asp Leu Leu Gln Leu Val 88 170 175 180 185 90 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat aac 748 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200 94 cag gat tgg atc caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 796 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96 205 210 215 98 gtc ggt gac aag ctt aga ata tac ccg aga atg atc aga ccg ata gta 844 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100 220 225 230 102 cat tgg ttc atg cca tcc tgt tgg gag ctg cgc cga tcg ctg cga cgc 892 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104 235 240 245 106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ctg aag 940 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag cag ggc aag ccc ctt atg ttt gat gat tcc atc 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg acg gt gcc cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccc aaa gtg cta caa agtg cta caa gca 1132																		
88 170 175 180 185 90 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat aac 748 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 200 94 cag gat tgg atc caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 796 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96 205 210 215 98 gtc ggt gac aag ctt aga ata tac ccg aga atg atc aga ccg ata gta 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100 220 225 230 844 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100 220 225 230 892 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104 235 240 245 106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ctg aag 940 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag gag gag ccc ctt atg ttt gat gat tcc atc 111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc ctc ata gtt gct atc cac acc acg agt gac cta ctc 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 1132																		700
90 gcc cgg atg tcg aca aga gtg ttc ctt ggc gag gaa atg tgc aat aac 91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92			Asp	Trp	Arg	Glu		Tyr	Pro	Ala	Arg	_	Leu	Leu	Gln	Leu		
91 Ala Arg Met Ser Thr Arg Val Phe Leu Gly Glu Glu Met Cys Asn Asn 92 190 195 200 94 cag gat tgg atc caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 796 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96 205 210 215 98 gtc ggt gac aag ctt aga ata tac ccg aga atg atc aga ccg ata gta 844 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100 220 225 230 102 cat tgg ttc atg cca tcc tgt tgg gag ctg cgc cga tcg ctg cga cgc 892 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104 235 240 245 106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ctg aag 940 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag cag ggc aag ccc ctt atg ttt gat gat tcc atc 988 111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aag gtg cta caa gtg cta caa gta gca 1132																		
92																		748
94 cag gat tgg atc caa acc tca tca caa tac gcg gcc ctt gcc ttc ggt 95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96			Arg	Met	Ser		Arg	Val	Phe	Leu		GLu	Glu	Met	Cys		Asn	
95 Gln Asp Trp Ile Gln Thr Ser Ser Gln Tyr Ala Ala Leu Ala Phe Gly 96																		706
96		-																796
98 gtc ggt gac aag ctt aga ata tac ccg aga atg atc aga ccg ata gta 99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100			Asp	Trp		GIN	Tnr	Ser	ser		Tyr	Ата	Ата	Leu		Pne	GIY	
99 Val Gly Asp Lys Leu Arg Ile Tyr Pro Arg Met Ile Arg Pro Ile Val 100																		0.4.4
100		-		_	_		_			-	-	_		_	_		-	044
102 cat tgg ttc atg cca tcc tgt tgg gag ctg cgc cga tcg ctg cga cgc cgc 892 103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104			GTÄ			ьeu	Arg	TTE			AIG	Met	ire			116	Val	
103 His Trp Phe Met Pro Ser Cys Trp Glu Leu Arg Arg Ser Leu Arg Arg 104			+ +~				+ ~ ~	. +~+			. ata					T 00		892
104																		092
106 tgc cga cag att ctc acg ccg tac att cac aaa cgc aag tcc ctg aag 940 107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250			_		Met	. PIC	, 261	_	_	GIU	пес	1 MIG			. пе	ı AIÇ	ALY	
107 Cys Arg Gln Ile Leu Thr Pro Tyr Ile His Lys Arg Lys Ser Leu Lys 108 250 255 260 265 110 ggg acc acg gac gag cag ggc aag ccc ctt atg ttt gat gat tcc atc 988 111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aac gtg cta caa gca 1132					r att	cto	aco			att	Cac			_	t ta	- ctc	n aan	940
108 250		_	_	-														310
110 ggg acc acg gac gag cag ggc aag ccc ctt atg ttt gat gat tcc atc 111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132		_		, 011		. 1100			, 1,1	. 110				, Ly.	, ,,,	. дес		
111 Gly Thr Thr Asp Glu Gln Gly Lys Pro Leu Met Phe Asp Asp Ser Ile 112				r acc	r dac	gag			. aac	r ccc	ctt			r gat	gat	t taa		988
112 270 275 280 114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132																		200
114 gag tgg ttc gag cga gag ctg ggt ccc aac cac gac gcg gtc ctg aag 1036 115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132		_							-1-									
115 Glu Trp Phe Glu Arg Glu Leu Gly Pro Asn His Asp Ala Val Leu Lys 116			r taa	r t.t.c	gad			r cta	r aat				gad	α α α	a ato			1036
116 285 290 295 118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132																		
118 cag gtc acg ctc tcc ata gtt gct atc cac acc acg agt gac cta ctc 1084 119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132							,		2								1 -	
119 Gln Val Thr Leu Ser Ile Val Ala Ile His Thr Thr Ser Asp Leu Leu 120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132			a ata	acc			ata	att	: act			acc	aco	a a a a			ctc	1084
120 300 305 310 122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132																		
122 ttg cag gcc atg agc gat ctc gcg cag aac ccg aaa gtg cta caa gca 1132																		
			r cad			ago	gat	cto			aac	ccc	, aaa			a caa	a gca	1132

Input Set : A:\Pto.amc

104		215					220					225					
124		315					320					325					1100
	gtg																1180
	Val	Arg	GIU	GIU	Val		Arg	Val	Leu	ser		GIU	GIY	Leu	ser	-	
	330					335					340					345	1000
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	Val	Ser	Leu	Hls		Leu	rys	Leu	мет	-	Ser	Ala	Leu	rys		ser	
132					350					355					360		1076
	cag	_				-						_		_	_	_	1276
	Gln	Arg	Leu	_	Pro	Thr	Leu	Leu	_	Ser	Phe	Arg	Arg		Ala	Thr	
136				365					370					375			
	aat	_		_	_	-	-			-		_				_	1324
	Asn	Asp		Lys	Leu	Lys	Ser	_	Phe	Val	Ile	Lys	_	Gly	Thr	Arg	
140			380					385					390				
	gtc	_		_	_			_								_	1372
	Val		Ile	Asp	Ser	Thr		Met	Trp	Asn	Pro		Tyr	Tyr	Thr	Asp	
144		395					400					405					
	cct																1420
	Pro	Leu	Gln	Tyr	Asp	_	Tyr	Arg	Tyr	Phe		Lys	Arg	Gln	Thr		
	410					415					420					425	
	ggc		_	_			_		-	-		_	_			_	1468
	Gly	Glu	Asp	Lys		Ala	Leu	Leu	Val		Thr	Ser	Ala	Asn		Met	
152					430					435					440		
154	gga	ttc	ggt	cac	ggc	gtt	cac	gcc	tgt	cct	ggc	aga	ttc	ttc	gcc	tcc	1516
	Gly	Phe	Gly	His	Gly	Val	His	Ala	Cys	Pro	Gly	Arg	Phe	Phe	Ala	Ser	
156				445					450					455			
158	aac	gag	atc	aag	att	gcc	ttg	tgt	cat	atc	atc	tta	aat	tat	gag	tgg	1564
	Asn	Glu	Ile	Lys	Ile	Ala	Leu	Cys	His	Ile	Ile	Leu	Asn	Tyr	Glu	Trp	
160			460					465					470				
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163	Arg	Leu	Pro	Asp	Gly	Phe	Lys	Pro	Gln	Pro	Leu	Asn	Ile	Gly	Met	Thr	
164		475					480					485					
166	tat	ctg	gcg	gat	CCC	aat	acc	agg	atg	ctg	atc	agg	cca	cgc	aag	gcg	1660
167	Tyr	Leu	Ala	Asp	Pro		\mathtt{Thr}	Arg	Met	Leu	Ile	Arg	Pro	Arg	Lys	Ala	
	490					495					500					505	
	gag									tag	gtc	gaaca	acg a	aagto	cctga	at	1710
171	Glu	Ile	Asp	Met	Ala	Ser	Leu	Thr	Val	*							
172					510												
174	gaag	gtgti	tat 1	iggt	cagt	gg gt	gaag	gcaag	j to	gcaga	aaat	gtgt	caaca	aat t	tata	aagaat	1770
175	aaaa	aaa															1776
177	<210)> SI	EQ II	ON C	: 2												
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183	Met	Pro	Phe	Phe	Thr	Gly	Leu	Leu	Ala	Ile	Tyr	His	Ser	Leu	Ile	Leu	
184					5					10					15		
	Asp	Asn	Pro	Val	Gln	Thr	Leu	Ser	Thr	Ile	Val	Val	Leu	Ala	Ala	Ala	
186				20					25					30			
187	Tyr	Trp	Leu	Ala	Thr	Leu	Gln	Pro	Ser	Asp	Leu	Pro	Glu	Leu	Asn	Pro	

Input Set : A:\Pto.amc

184
191 Glu
192 65 Tyr Arg Leu Met Ser Glu Trp Gly Ser Leu Ile Met Ser Glu Trp Gly Ser Leu Ile Val Pro 95 195 Pro Glu Cys Ala Asp Glu Leu Arg Asp Pro Arg Asp Met Asp Phe Glu Pro Asp Asp Pro Ile Trp Asp Met Asp Pro Glu Pro Asp Pro Asp
193 Glu Pro Tyr Arg Leu Met Ser Glu Trp Gly Ser Leu Ile Val Leu Pro 194
194
195 Pro Glu Cys Ala Asp Glu Leu Arg Asp Asp Asp Pro Arg Met Asp Phe Glu Asp Phe Glu 100
196
197 Thr Pro Thr Thr Asp Asp Ser His Gly Tyr Ile Pro Gly Phe Asp Ala Asp Pro Asn Leu Thr Lys Val Val Thr Lys Tyr Leu Thr Tyr Leu Thr Lys Val Val Thr Lys Tyr Leu Thr Tyr Leu Tyr Tyr Leu Tyr
198 Leu Asn Ala Asp Ala Asp Pro Asn Leu Thr Lys Val Val Thr Lys Tyr Leu Thr 200 130 Leu Asn Ala Asp Pro Asn Leu Thr Lys Val Val Thr Lys Tyr Leu Thr 200 130 Leu Thr 135 Leu Thr Lys Val Val Thr Lys Tyr Leu Thr 140 Leu Thr 140 140 Leu Thr 140
199 Leu Asn Ala Asp Pro Asn Leu Thr Lys Val Thr Lys Tyr Leu Thr 200 130 135 140
200 130
1
202 145
203 Ala Met Lys Ala Val Leu Gly Asp Asp Pro Asp Trp Arg Glu Ile Tyr Arg Arg Arg Arg Arg Leu Leu Leu Val Ala Arg Met Ser Thr Arg Val 206
204
205 Pro Ala Arg Asp Leu Leu Gln Leu Val Ala Arg Met Ser Thr Arg Val 180
206 180 180 185 190 1
207 Phe Leu Gly Glu Glu Met Cys Asn Asn Gln Asp Trp Ile Gln Thr Ser 195
208
209 Ser Gln Tyr Ala Ala Leu Ala Phe Gly Val Gly Asp Leu Arg Ile 210 210 1 1 215 1 1 220 1
210 215 220 220 220 220 240 240 211 Tyr Pro Arg Met Ile Arg Pro Ile Val His Trp Phe Met Pro Ser Cys 212 225 225 230 230 240 240 240 240 213 Trp Glu Leu Arg Arg Leu Arg Cys Arg Gln Ile Leu Thr Pro 240 214 Tyr Ile His Lys Arg Leu Arg Cys Arg Gln Ile Leu Thr Thr Pro 255 Thr Thr Pro Glu Glu Glu Glu Glu Glu Glu Glu Glu Leu 215 Tyr Pro Leu Met Pro Asp Asp Ser Ile Leu Leu Thr Thr Pro Glu Arg Glu Leu Leu Arg F
211 Tyr Pro Arg Met Ile Arg Pro Ile Val His Trp Phe Met Pro Ser Lys Arg Ile His Trp Phe Met Pro Ser Lys Arg Cys Arg Gln Ile Leu Thr Pro 214 Tyr Ile His Lys Arg Lys Ser Leu Lys Gly Thr Thr Arg Glu Gly Gly Gly Thr Thr Arg Glu Gly Gly Gly Thr Thr Arg Gly Gly Gly Hus H
212 225 Leu Arg Arg Ser Leu Arg Arg Cys Arg Cys Arg Gln Ile Leu Thr Pro 213 Trp Glu Leu Arg Arg Ser Leu Arg Cys Arg Gln Ile Leu Thr Pro 214 Leu Lys Gly Thr Thr Asp Glu Gln Gly Gly Gly Thr Thr Arg Glu Gln Gly 215 Tyr Ile His Lys Arg Lys Ser Leu Lys Gly Thr Thr Asp Glu Gln Gly 216 Lys Gly Thr Thr Asp Glu Gln Gly 217 Lys Pro Leu Met Phe Asp Asp Ser Ile Glu Trp Phe Glu Arg Glu Leu
213 Trp Glu Leu Arg Arg Ser Leu Arg Arg Cys Arg Gln Ile Leu Thr Pro 214
214
215 Tyr Ile His Lys Arg Lys Ser Leu Lys Gly Thr Thr Asp Glu Gln Gly 216 260 265 270 217 Lys Pro Leu Met Phe Asp Asp Ser Ile Glu Trp Phe Glu Arg Glu Leu
$\begin{array}{cccccccccccccccccccccccccccccccccccc$
217 Lys Pro Leu Met Phe Asp Asp Ser Ile Glu Trp Phe Glu Arg Glu Leu
219 Gly Pro Asn His Asp Ala Val Leu Lys Gln Val Thr Leu Ser Ile Val
220 290 295 300
221 Ala Ile His Thr Thr Ser Asp Leu Leu Gln Ala Met Ser Asp Leu
222 305 310 315 320
223 Ala Gln Asn Pro Lys Val Leu Gln Ala Val Arg Glu Glu Val Val Arg
224 325 330 335
225 Val Leu Ser Thr Glu Gly Leu Ser Lys Val Ser Leu His Ser Leu Lys
226 340 345 350
227 Leu Met Asp Ser Ala Leu Lys Glu Ser Gln Arg Leu Arg Pro Thr Leu
228 355 360 365
229 Leu Gly Ser Phe Arg Arg Gln Ala Thr Asn Asp Ile Lys Leu Lys Ser
230 370 375 380
231 Gly Phe Val Ile Lys Lys Gly Thr Arg Val Val Ile Asp Ser Thr His
232 385 390 395 400
233 Met Trp Asn Pro Glu Tyr Tyr Thr Asp Pro Leu Gln Tyr Asp Gly Tyr
234 405 410 415
235 Arg Tyr Phe Asn Lys Arg Gln Thr Pro Gly Glu Asp Lys Asn Ala Leu 236 420 425 430

Input Set : A:\Pto.amc

	Leu	Val		Thr	Ser	Ala	Asn		Met	Gly	Phe	Gly	His	Gly	Val	His	
238		_	435	01		D)	D1	440	C	3	C1	т1 -		Tlo	. ו ג	T 011	
239	Ala	Cys 450	Pro	GLY	Arg	Pne	455	АТА	Ser	Asn	GIU	11e	гуѕ	ile	Ala	ьец	
	Cvc		Tle	Tle	T.e.11	Δsn		Glu	Trp	Ara	Leu	Pro	Asp	Glv	Phe	Lvs	
242		IIIS	110	110	пси	470	- 1 -	Olu	115	*** 9	475	110		0-1		480	
		a1	D	T	7		C1	Mot	mb ~	M•••		7 l -	A cn	Dro	A c n		
	Pro	GIN	Pro	Leu		rre	GIĀ	Met	Thr		ьец	Ala	АБР	PIO		1111	
244					485	_	_	_		490	~ 3	_			495	T	
	Arg	Met	Leu		Arg	Pro	Arg	Lys	Ala	Glu	He	Asp	Met		Ser	Leu	
246				500					505					510			
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255	<220)> FE	EATUF	RE:													
256	<221	> NA	AME/F	EY:	CDS												
)CAT]			C	2031)									
						•			oxido	oredi	ictas	se					
			EQUEN														
						ata	gac	acc	agc	tcc	acc	ata	taa	gag	aca	a t.a	48
									Ser								
		GLY	нэр	261	5	Val	лэр	TIII	DCI	10	1111	val	001	Olu	15		
263	1				-		++-		-+-		<i>~~</i> ~ ~	2+4	a + +	a+a		taa	96
									atg								20
	Ala	GIU	GIU		Ser	Leu	Pne	ser	Met	THE	ASP	мес	TTE		Pne	ser	
267				20					25					30			144
									tgg								144
	Leu	Ile		Gly	Leu	Leu	Thr		Trp	Phe	Leu	Pne		гàг	гĀг	гÀг	
271			35					40					45				
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274	Glu	Glu	Val	Pro	Glu	Phe	Thr	Lys	Ile	Gln	Thr	Leu	Thr	Ser	Ser	Val	
275		50					55					60					
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278	Arg	Glu	Ser	Ser	Phe	Val	Glu	Lys	Met	Lys	Lys	Thr	Gly	Arg	Asn	Ile	
279	65					70					75					80	
281	atc	gtg	ttc	tac	ggc	tcc	cag	acg	ggg	act	gca	gag	gag	ttt	gcc	aac	288
282	Ile	Val	Phe	Tyr	Gly	Ser	Gln	Thr	Gly	Thr	Ala	Glu	Glu	Phe	Ala	Asn	
283				-	85				-	90					95		
	cac	cta	tcc	aaq	qac	qcc	cac	cqc	tac	qqq	atq	cga	ggc	atg	tca	gcg	336
									Tyr								
287	9			100				5	105	-			-	110			
	a a c	cct	aaa		tat	gac	cta	acc	gac	cta	agc	agc	ata		gag	atc	384
200	Nan	Dro	Clu	Clu	Пиг	A c n	Len	λla	Asp	T.e.11	Ser	Ser	T.e.ii	Pro	Glu	Tle	
	АБР	FIO	115	GIU	тут	изр	пси	120	пор	шси	001	501	125				
291	~			a+	~+~	~++	++~	_	a+~	~~~	3.00	tac		u a u	aas	asa	432
293	yac	adC	900	Tar	y L 9	911	Dh.	Core	atg	900	mh-	Tree-	231	Glu	99a	Acn	752
	Asp		Ala	ьeu	va⊥	vai		Cys	Met	HId	1111		GIA	GIU	GTÅ	гэр	
295		130					135					140		~~~	2.02	~~~	480
297	ccc	acc	gac	aat	gcc	cag	gac	ttc	tac	gac	τgg	ctg	cag	gag	aca	yac	400
298	Pro	Thr	Asp	Asn	Ala	Gln	Asp	Phe	Tyr	Asp	Trp	Leu	GIn	Glu	Thr	Asp	

RAW SEQUENCE LISTING ERROR SUMMARY PATENT APPLICATION: US/10/021,425

DATE: 07/22/2002 TIME: 09:35:08

Input Set : A:\Pto.amc

Output Set: N:\CRF3\07222002\J021425.raw

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the $\langle 220 \rangle$ to $\langle 223 \rangle$ fields of each sequence which presents at least one n or Xaa.

Seq#:11; N Pos. 6,9
Seq#:12; N Pos. 4,10,16